

PENDING CLAIMS

1. A system for delivering a guide wire to an artery and a side branch vessel of the artery, the system comprising:

a catheter defining a shaft having a circumference, a first lumen with a first opening and a second lumen with a second opening;

a first guide wire configured to extend through the first lumen; and

a second guide wire configured to extend through the second lumen,

wherein the first opening is configured to direct the first guide wire into the side branch vessel, and the second opening is configured to direct the second guide wire into the artery.

2. The system of claim 1, wherein the catheter further comprises a radiopaque indicator adjacent to the first opening.

3. The system of claim 2, wherein the radiopaque indicator comprises at least one stud attached to the shaft.

4. The system of claim 2, wherein the radiopaque indicator comprises a ring that encircles at least a part of the circumference of the shaft.

5. The system of claim 4, wherein the ring includes an opening and the opening is adjacent to the first opening in the shaft.

6. The system of claim 4, wherein the ring includes an opening and the opening is coaxial with the first opening in the shaft.

7. The system of claim 4, wherein the ring includes an extension and the extension projects into the first opening in the shaft.

8. The system of claim 4, wherein the ring comprises a pair of bands that are joined at a first point of the circumference of the bands and are separated at a second point of the circumference of the bands, and the first opening is positioned between a separation at the second point of the pair of bands.

9. The system of claim 4, wherein the ring includes a cut-out section.

10. The system of claim 1, wherein the catheter comprises a first section including the first lumen and the second lumen and extending between the first end and the first opening, and a second section including the second lumen and extending between the first opening and the second end, and the second section has a smaller cross-section than a cross-section of the first section.

11. The system of claim 10, wherein the catheter includes an aimer positioned at least in part on the second section in a position that is adjacent to the first section.

12. The system of claim 11, wherein the aimer includes a surface that is configured to direct the guide wire in the first lumen in a direction away from the catheter when the guide wire passes through the first opening.

13. The system of claim 1, wherein the catheter includes an inflatable balloon positioned on the catheter adjacent to the first opening, whereby a guide wire passing through the first opening is deflected by the balloon.

14. The system of claim 1, further comprising at least one balloon inflation catheter configured to be delivered over one of the guide wires.

15. A delivery catheter configured to deliver a first guide wire to an artery and a second guide wire to a side branch vessel of the artery, the delivery catheter comprising:
a shaft having a first end and a second end;

a first lumen in the shaft passing to a first opening in the shaft; and
a second lumen passing to a second opening in the shaft, the first lumen and the second lumen being simultaneously accessible from the first end of the shaft.

16. The delivery catheter of claim 15, wherein the catheter further comprises a radiopaque indicator attached to the shaft at a location adjacent to the first opening.

17. The delivery catheter of claim 16, wherein the radiopaque indicator comprises at least one stud attached to the shaft.

18. The delivery catheter of claim 16, wherein the radiopaque indicator comprises a ring that encircles at least a part of the circumference of the shaft.

19. The delivery catheter of claim 18, wherein the ring includes an opening and the opening is adjacent to the first opening in the shaft.

20. The delivery catheter of claim 18, wherein the ring includes an opening and the opening is coaxial with the first opening in the shaft.

21. The delivery catheter of claim 18, wherein the ring includes an extension and the extension projects into the first opening in the shaft.

22. The delivery catheter of claim 18, wherein the ring comprises a pair of bands that are joined at a first point of the circumference of the bands and are separated at a second point of the circumference of the bands, and the first opening is positioned between separation at the second point of the pair of bands.

23. The delivery catheter of claim 18, wherein the ring includes a cut-out section.

24. The delivery catheter of claim 15, wherein the shaft comprises a first section including the first lumen and the second lumen and extending between the first end and the first opening, and a second section including the second lumen and extending between the first opening and the second end, and the second section has a smaller cross-section than a cross-section of the first section.

25. The delivery catheter of claim 24, wherein the catheter includes an aimer positioned at least in part on the second section in a position that is adjacent to the first section.

26. The delivery catheter of claim 25, wherein the aimer includes a surface that is configured to direct the guide wire in the first lumen in a direction away from the catheter when the guide wire passes through the first opening.

27. The delivery catheter of claim 15, wherein the catheter includes an inflatable balloon positioned on the catheter adjacent to the first opening, whereby a guide wire passing through the first opening is deflected by the balloon.

28. A method of catheterizing an artery and a side branch of the artery, the method comprising:

providing a side branch delivery catheter comprising a shaft having a first end and a second end, a first lumen in the shaft passing to a first opening in the shaft, and a second lumen passing to a second opening in the shaft;

inserting the delivery catheter into the vasculature;

advancing the delivery catheter into an artery;

positioning the first opening adjacent to the side branch of the artery;

inserting a first guide wire into the opening in the hub and advancing the guide wire into the first lumen;

inserting a second guide wire into the opening in the hub and advancing the guide wire into the second lumen; and

advancing the first guide wire through the first opening and into the side branch of the artery.

29. The method of claim 28, further comprising advancing the second guide wire through the second opening and into the artery.

30. The method of claim 28, further comprising:
providing an inflatable balloon catheter having an inflatable balloon;
advancing the inflatable balloon catheter over the first guide wire; and
deploying the inflatable balloon in the side branch of the artery.

31. The method of claim 28, further comprising:
providing an inflatable balloon catheter having an inflatable balloon;
advancing the inflatable balloon catheter over the second guide wire; and
deploying the inflatable balloon in the artery.

32. The method of claim 28, wherein positioning the first opening adjacent to the side branch of the artery comprises viewing a radiopaque indicator mounted on the catheter under fluoroscopy to orient the indicator relative to the side branch of the artery.